



**UNIVERSITY OF SANTO TOMAS
FACULTY OF ENGINEERING
CIVIL ENGINEERING DEPARTMENT**



OBE COURSE SYLLABUS

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|--|----------------------------|--------------------------------|---|---------------|
| Course Title | Fluid Mechanics Laboratory | Course Description | To demonstrate different experiments about fluid properties; fluid static, hydrokinetics and hydrodynamics; and analyze the behavior of fluid flow along different flow meters. | |
| Course Code | CE 412L (P-10) | Credit Units: | 1 unit laboratory | |
| Course Prerequisites/ Co-requisites: | MECH 500 (E-06) | Other Enrollment Requirements: | 4th year standing | |
| Applicable Program Outcomes | | | | |
| b-D1. An ability to design and conduct experiments, as well as to analyze and interpret data accordingly | | | | |
| e-D3. An ability to identify, formulate and solve Civil Engineering problems correctly | | | | |
| Course Intended Learning Outcomes (CILO): | | PO Code links | | PO Code links |
| On successful completion of this course, the student should be able to: | | | | |
| LO1. Define and describe the fundamental properties of fluids. | | a-K1 | LO6. Analyze the statical stability of floating bodies and be able to determine the metacentric height and righting moment. | e-D3 |
| LO2. Explain hydrostatic pressure principles and be familiarize with the different types of manometers. | | a-K1 | LO7. Analyze the relative equilibrium of liquids on vessels moving with constant linear acceleration and rotating about a vertical axis. | e-D3 |
| LO3. Solve for hydrostatic pressure on plane and curved surfaces. | | e-D3 | LO8. Define and describe the fundamentals of fluid flow. | e-D3 |
| LO4. Solve applications about Archimedes’ Principle. | | e-D3 | LO9. Apply Bernoulli’s Energy Theorem in solving for fluid discharge in different flow meters. | e-D3 |
| LO5. Determine the hydrostatic forces acting on circular pipes and dams. | | e-D3 | LO10. Analyze the behaviour of fluids subjected in an orifice and determine different orifice coefficients. | e-D3 |

| Week | Module Short Title | CILO | Teaching and Learning Activities(TLA) | Outcome-Based Assessment (OBA) | Weight of Module to CILO |
|---|--|-------------|---|---|--------------------------|
| 1 | Hydrostatic Pressure | L1, L2 | Lecture-Discussion, Problem-based learning, Problem Solving | Plate Score | 4 |
| 2 | Determination of Specific Gravity by U-tube | L1, L2 | Lecture-Discussion, Lab Experiment | Group Laboratory Report | 8 |
| 3 | Hydrostatic Force on Planes and Curved Surfaces | L3 | Lecture-Discussion, Problem-based learning, Problem Solving | Plate Score | 8 |
| 4 | Hydrostatic Force on Submerged and Semi-Submerged Face | L3 | Lecture-Discussion, Lab Experiment | Group Laboratory Report | 8 |
| 5-6 | Principle of Archimedes | L4 | Lecture-Discussion, Problem-based learning, Problem Solving, Lab Experiment | Plate Score, Group Laboratory Report | 12 |
| 7-8 | Hoop Stress, Dam and Metacentric Height | L5, L6 | Lecture-Discussion, Problem-based learning, Problem Solving, Lab Experiment | Plate Score, Problem Set Score, Group Laboratory Report | 12 |
| 9 | Relative Equilibrium of Liquids | L7 | Lecture-Discussion, Problem-based learning, Problem Solving | Plate Score | 4 |
| 10 | Investigation of Forced Vortices | L7 | Lecture-Discussion, Lab Experiment | Group Laboratory Report | 8 |
| 11 | Fundamentals of Fluid Flow | L8 | Lecture-Discussion, Problem-based learning, Problem Solving | Plate Score | 4 |
| 12 | Determination of the Total Head at Various Cross-Sections of a Passage | L8 | Lecture-Discussion, Lab Experiment | Group Laboratory Report | 8 |
| 13 | Flow Meter Demonstration | L8, L9 | Lecture-Discussion, Lab Experiment | Group Laboratory Report | 8 |
| 14-15 | Determination of Orifice Coefficients | L8, L9, L10 | Lecture-Discussion, Lab Experiment | Group Laboratory Report | 8 |
| 16 | Emptying Time from a Given Initial Head | L8, L9, L10 | Lecture-Discussion, Lab Experiment | Group Laboratory Report | 8 |
| FINAL GRADE EVALUATION / TRANSMUTATION SYSTEM | | | TRANSMUTATION TABLE | | |
| <p><i>AVERAGE = AVERAGE (QUIZZES + PE + FE) ≥ 75</i></p> <p>Where: PE – Preliminary Examination FE – Final Examination</p> | | | 1.00 | 96 - 100 | 2.25 84 - 86 |
| | | | 1.25 | 94 - 95 | 2.50 82 - 83 |
| | | | 1.50 | 92 - 93 | 2.75 79 - 81 |
| | | | 1.75 | 89 - 91 | 3.00 75 - 78 |
| | | | 2.00 | 87 - 88 | 5.00 0 - 74 |

| PRINTED LEARNING RESOURCES: | | ONLINE LEARNING RESOURCES: |
|---|-------------------|--|
| Mays, Larry W. 2004. <i>Water Resources Engineering, 2005 Edition</i> . USA. | | |
| Robert L. Daugherty, Joseph B. Franzini and E. John Finnemore. 2002. <i>Fluid Mechanics with Engineering Applications, SI Metric Edition</i> . USA. | | |
| Ray K. Linsley, Joseph B. Franzini, david L. Freyberg and David L. Tchobanoglous. 1992. <i>Water Resources Engineering, Fourth Edition</i> . USA. | | |
| John A. Roberson, John J. Cassidy and M. Hanif Chaudhry. 1988. <i>Hydraulic Engineering, Second Edition</i> . USA. | | |
| H.W. King, J.O. Wisler and J.G. Woodburn. 1980. <i>Hydraulics, Fifth Edition</i> . R. E. Krieger Publishing Company. | | |
| CLASS POLICIES | | |
| 1 | ADMISSION | Only officially enrolled students in the course, as ascertained by their UST Form 1 or Form 6 (Registration Form), shall be admitted to class; unless, otherwise endorsed by the administration. |
| 2 | ATTENDANCE | <p>For a 1-unit laboratory course, the maximum allowable number of absences is 10 hours.</p> <p>Pursuant to PPS No. 1010 (Attendance) of the university and the guidelines of the Faculty of Engineering, the following policies shall be observed:</p> <ul style="list-style-type: none"> for a 0700 class: <ul style="list-style-type: none"> any student who arrives within 15 minutes after the time shall be marked “late”; beyond 15 minutes to 30 minutes, shall be marked “tardy”; beyond 30 minutes, shall be marked “absent” for all other classes: <ul style="list-style-type: none"> any student who arrives within 10 minutes after the time shall be marked “late”; beyond 10 minutes to 20 minutes, shall be marked “tardy”; beyond 20 minutes, shall be marked “absent” <p>Three counts of being “tardy” shall be equivalent to 1 hour of being “absent.”</p> <p>Attendance of a student includes wearing proper prescribed uniform with appropriately displayed UST Student I.D. In cases wherein there is a deviation from the prescribed uniform and/or missing UST Student I.D., student must first seek endorsement from the Dean’s Office to be admitted to class.</p> |
| 3 | CLASSROOM DECORUM | Pursuant to PPS No. 1027 (Code of Conduct and Discipline) of the university, students must observe proper decorum during and after class hours within school grounds. |
| 4 | EXAMINATIONS | <p>Special quizzes and examinations are given should a student be unable to take a scheduled quiz due to considerable reasons provided a letter of request with the endorsement of the Dean’s Office is presented. Habitual request for special quizzes will be a case for student referral to the Guidance and Counselling Department and shall merit corresponding academic action from the Department.</p> <p>Cheating, either caught-in-the-act or elucidated after the examination or quiz, shall merit proper disciplinary action and penalty/ies as stipulated under PPS No. 1017 (Examinations) and PPS No. 1028 (Penalties), or, as deemed just by the Department or Faculty. Cheating is identified as any of the following forms, any student who:</p> <ul style="list-style-type: none"> deliberately looks at another’s examination paper; talks or communicates with another without permission during the examination; copies from another’s examination paper or report; sends another to take the examination/course/class requirement; |

CLASS POLICIES

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|---|---------------------------|--|
| | | <ul style="list-style-type: none">• renders such aid On major examinations, students must present their examination permits before the exam or any correspondence endorsed by the Dean’s Office authorizing the student to take the examination. |
| 5 | CONSULTATION HOURS | Consultation hours with the student shall be held at the Department of Civil Engineering Faculty Room, Lab 6-2, G/F, Roque Ruano Bldg. from ____ to ____. |

Prepared by:

Approved by:

Engr. Arvin Jester A. Manalaysay

Faculty Member

Date: _____

Engr. Rodelio A. Tiburcio

Department Head

Date: _____